



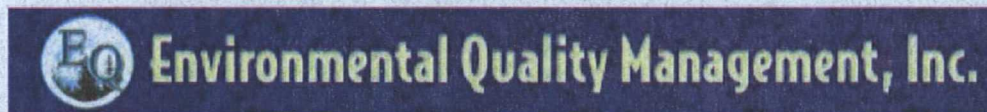
474096

# Portage Creek Sediment Remediation Project Kalamazoo, Michigan

Post-Sediment Removal Structure Feature Assessment  
Removal Areas SA5-Axtell, SA5-D and SA5-C



Prepared For:



Prepared By:



**FLEIS & VANDENBRINK**  
**ENGINEERING, INC.**

F&V Project Number: 809930  
October, 2012



#### General Notes:

- The Post-Sediment Removal Structural Feature Assessment is based on observable conditions at the time of assessment and is not a guarantee of the condition of the various structures or an evaluation of the potential for long term impacts of the sediment removal process.
- No testing of materials or other in-depth evaluation was performed as part of the assessment.
- Structures are numbered corresponding to the Pre-Sediment Removal Structural Feature Assessment. Refer to the corresponding report for comparison of pre- and post-sediment removal conditions.

Designation: SA5-Axtell-S01

Location: SA5-Axtell-S01 is the concrete outlet control structure just east of John Street.

Description: SA5-Axtell-S01 is a cast in place concrete outlet control structure consisting of headwall and wingwalls. The structure supports the slope behind where Axtell Creek transitions from closed conduit (culverts) to an open channel. The culverts are submerged below the normal water line.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.



Elevation view of the structure



Structure viewed from the north bank



Designation: SA5-Axtell-S02

Location: SA5-Axtell-S02 is the fence parallel to Axtell Creek along the top of the south bank.

Description: SA5-Axtell-S02 is a chain link fence with concrete bases.

Assessment Findings:

- The west end of the fence was not removed and does not appear to have been impacted during sediment removal.
- The fencing removed to accommodate sediment removal should be replaced, if directed so by the property owner.



View of remaining fence from the northwest



Concrete base exposed by bank erosion



Designation: SA5-Axtell-S03

Location: SA5-Axtell-S03 is the curb parallel to Axtell Creek at the top of the south bank at the west end of SA5-Axtell.

Description: SA5-Axtell-S03 is a concrete curb structure

Assessment Findings:

- Bank erosion along the back of curb appears unchanged.
- The structure does not appear to have been impacted during sediment removal.



Bank erosion exposing back of curb and vegetation growth



View of bank erosion behind the concrete curb



Designation: SA5-Axtell-S04

Location: SA5-Axtell-S04 is the bumper rail parallel to Axtell Creek adjacent to the Primary Support Area.

Description: SA5-Axtell-S04 is a steel bumper rail consisting of square tube posts and rail.

Assessment Findings:

- There are still several failed section of railing.
- The structure does not appear to have been impacted during sediment removal.



West end of rail looking east



View of the rail looking east





Corrosion on rail looking east



View of the rail looking east





View of the rail looking east



View of the rail looking east



Designation: SA5-Axtell-S05

Location: SA5-Axtell-S05 is the asphalt pavement at the top of the south bank along Axtell Creek.

Description: SA5-Axtell-S05 is hot mixed asphalt pavement from previous development on the site.

**Assessment Findings:**

- The asphalt had significant cracking and minor spalling prior to sediment removal operations, however, cracks appear to have expanded and the edge of the asphalt pavement has significant spalling in several areas.
- Spalled areas should be patched if required by the property owner.



Cracking and edge spalling on asphalt pavement



Cracking and edge spalling on asphalt pavement





Cracking and edge spalling on asphalt pavement



Cracking and edge spalling on asphalt pavement

Designation: SA5-Axtell-S06

Location: SA5-Axtell-S06 was located on the south bank of Axtell Creek approximately 100' east of the outlet structure.

Description: SA5-Axtell-S06 was a concrete spillway for runoff from the asphalt parking lot at the top of the south bank.

Assessment Findings:

- The spillway was removed in conjunction with sediment removal, exposing a concrete outlet at the water line. The concrete outlet does not appear to have been impacted during sediment removal.





View of exposed outlet from upstream channel

Designation: SA5-Axtell-S07

Location: SA5-Axtell-S07 is located on the north bank of Axtell Creek approximately 150' east of the outlet structure.

Description: SA5-Axtell-S07 is a 12" clay storm sewer pipe from the Crosstown Parkway area.

Assessment Findings:

- Failed end sections were removed in conjunction with sediment removal.
- The remaining structure does not appear to have been impacted during sediment removal.
- The core log has been installed over the outlet and should be adjusted to prevent blockage.





View of the structure from the upstream bank



View of structure from the bank area



Designation: SA5-Axtell-S08

Location: SA5-Axtell-S08 is located on the south bank of Axtell Creek approximately 200' east of the outlet structure.

Description: SA5-Axtell-S08 is a concrete spillway for runoff from the asphalt parking lot at the top of the south bank.

Assessment Findings:

- The lower section of the spillway was removed in conjunction with sediment removal.
- The upper section does not appear to have been impacted during sediment removal.





View of bank restoration at the structure



Remaining upper section of the abandoned spillway

Designation: SA5-D-S01

Location: SA5-D-S01 is the Lake Street Bridge over Portage Creek just south of the removal limits for SA5-D.

Description: SA5-D-S01 is a single span bridge constructed in 1986. The superstructure is composed of side by side prestressed concrete box beams, concrete sidewalks, concrete parapet railings and an asphalt wearing surface. The substructure is composed of concrete curtain walls supported on cast in place concrete piles. Concrete block type retaining walls were constructed in all 4 quadrants to support the slopes.

Assessment Findings:

- The curb head was removed in the northeast quadrant to facilitate access. It and the adjacent sidewalk appear to have been marked for replacement.
- Restoration is required in the northwest and northeast quadrants.
- The fence along the northwest block wall should be replaced.
- The structure itself does not appear to have been impacted during sediment removal.





View of the structure from the northeast approach area



Curb cut in the northeast quadrant





Fence removed in northwest quadrant



Elevation view of structure from northwest bank





New riprap along northwest block wall



View of northeast block wall from the channel

Designation: SA5-D-S02

Location: SA5-D-S02 is located on the east bank of Portage Creek approximately 50' north of Lake Street.

Description: SA5-D-S02 is a concrete rubble wall consisting of large slabs of salvaged concrete.

Assessment Findings:

- The rubble wall functions as the headwall for an outlet pipe below the waterline, which was not visible during previous evaluation. Neither the headwall nor pipe appear to have been impacted during sediment removal.
- The bank has been restored around the structure.





View of the structure from the channel

Designation: SA5-D-S03

Location: SA5-D-S03 was located on the west bank of Portage Creek approximately 100' north of Lake Street.

Description: SA5-D-S03 was a small concrete wall, approximately 12" thick.

Assessment Findings:

- The concrete wall has been removed. It functioned as a headwall for a clay pipe outlet at the waterline, which was not visible during prior evaluation. The outlet does not appear to have been impacted during sediment removal.





Bank restoration in the previous wall location



Bank restoration at the structure





View of the outlet pipe at the waterline.



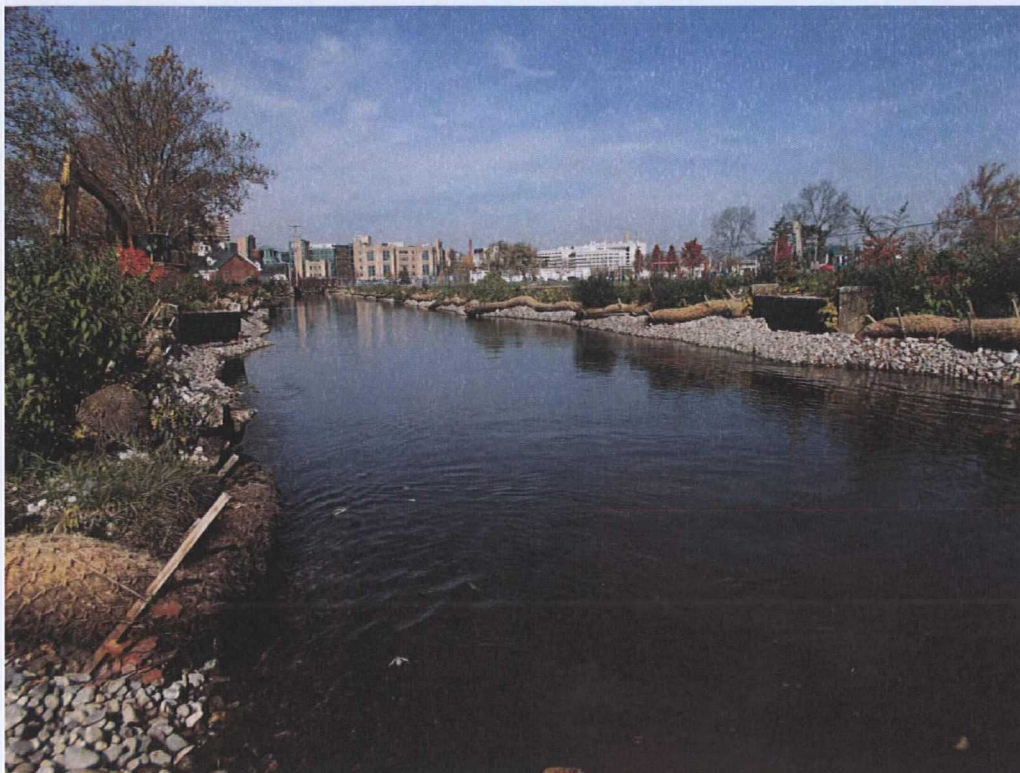
Designation: SA5-D-S04

Location: SA5-D-S04 is located on the banks of Portage Creek approximately 125' north of Lake Street.

Description: SA5-D-S04 is the remains of a previous bridge crossing. Each bank has a concrete abutment and a failed or failing concrete post. The superstructure has failed or been removed previously.

**Assessment Findings:**

- The structure does not appear to have been impacted during sediment removal. The banks have been restored around the remaining abutments.



View of structure from upstream channel



View of east abutment from channel area





View of west abutment from channel area

Designation: SA5-D-S05

Location: SA5-D-S05 is located on the east bank of Portage Creek approximately 150' north of Lake Street.

Description: SA5-D-S05 is a 2" steel conduit extending approximately 5' into the channel.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.
- The bank has been restored around the structure.





View of the structure from the channel area

Designation: SA5-D-S06

Location: SA5-D-S06 is located on the west bank of Portage Creek at the EQM stone access pad.

Description: SA5-D-S06 is a 10" concrete storm sewer outlet, apparently from a previous development.

Assessment Findings:

- The failed end section has been removed. The remaining outlet pipe does not appear to have been impacted during sediment removal.





View of the structure from the channel

Designation: SA5-D-S07

Location: SA5-D-S07 is located on the west bank of Portage Creek approximately 50' north of the EQM stone access pad.

Description: SA5-D-S07 is an 8" concrete storm sewer outlet, apparently from a previous development.

Assessment Findings:

- The structure was removed in conjunction with sediment removal operations.





View of bank restoration along the previous location of the structure

Designation: SA5-D-S08

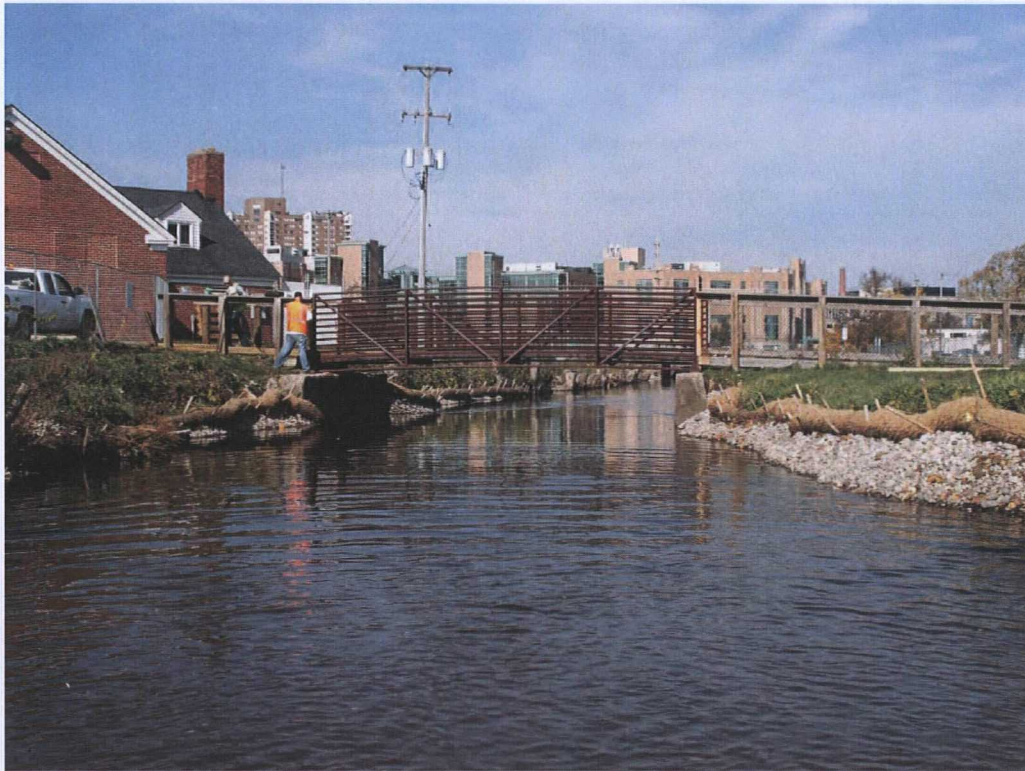
Location: SA5-D-S08 is located on Portage Creek at Upjohn Park, approximately 50' north of the confluence with Axtell Creek.

Description: SA5-D-S08 is a prefabricated weathering steel pedestrian truss bridge (Steadfast) on older concrete abutments. The structure has timber boardwalk-type approaches.

Assessment Findings:

- The superstructure was removed and replaced to accommodate sediment removal.
- EQM was in the process of restoring approach railings at the time of evaluation.
- The structure does not appear to have been impacted during sediment removal.





Elevation view of the structure from the upstream channel



View of structure from east approach

Designation: SA5-D-S09

Location: SA5-D-S09 is located on the east bank of Portage Creek approximately 25' north of the Upjohn Park pedestrian bridge.

Description: SA5-D-S09 is an 8" corrugated plastic storm sewer outlet.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.
- The core log restoration was installed in front of the outlet and should be adjusted to prevent blockage.





View of the outlet from the channel



Small flow of water from outlet



Designation: SA5-D-S10

Location: SA5-D-S10 is located on the banks of Portage Creek approximately 100' north of the Upjohn Park pedestrian bridge.

Description: SA5-D-S10 is a set of pipe bollards filled with concrete. There is a capped 2" steel conduit near the east bollard. The structure appears to be the remains of a previous above-grade natural gas main crossing.

Assessment Findings:

- The west bollard appears to be leaning toward the channel more than it was prior to sediment removal, however, the structure appears to be abandoned and likely can be left in place.





East bollard and suspected abandoned gas main



View of west bollard leaning toward channel area

Designation: SA5-D-S11

Location: SA5-D-S11 is located on the west bank of Portage Creek approximately 100' north of the Upjohn Park pedestrian bridge.

Description: SA5-D-S11 is a utility pole and guy wire. Overhead electric runs parallel to Portage Creek toward Crosstown Parkway.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of pole and guy from the channel area

Designation: SA5-D-S12

Location: SA5-D-S12 was located in the channel of Portage Creek, approximately 6' from the east bank and 125' north of the Upjohn Park pedestrian bridge.

Description: SA5-D-S12 was a pair of 1" steel pipes, apparently the remains of a pier structure.

Assessment Findings:

- The structure was removed in conjunction with sediment removal operations.





Bank restoration in the area of the previous structure

Designation: SA5-D-S13 / SA5-C-S01

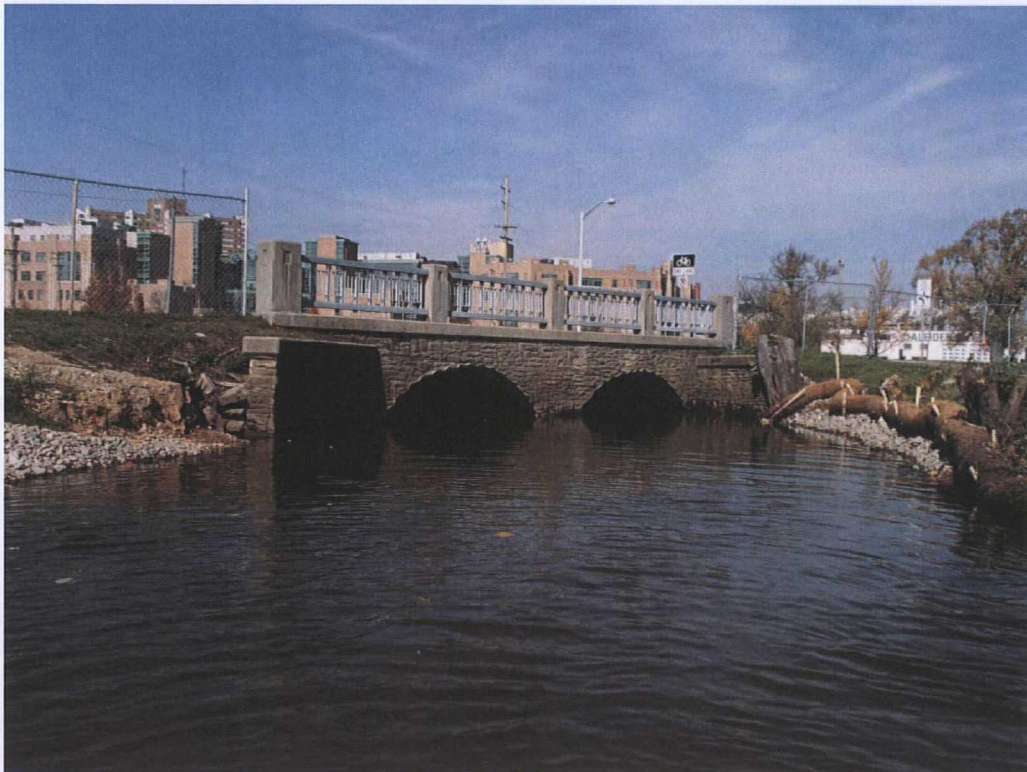
Location: SA5-D-S13 / SA5-C-S01 is the Crosstown Parkway bridge over Portage Creek. The bridge forms the dividing line between SA5-D and SA5-C.

Description: SA5-D-S13 / SA5-C-S01 a twin corrugated steel plate arch culvert structure with stone headwalls and wingwalls. Although plans for this structure are not available, it is suspected that the arch culverts bear on a spread concrete footing several feet below the channel bottom. The structure carries the asphalt pavement, concrete curb and gutter and concrete sidewalks and has steel panel railings.

**Assessment Findings:**

- Cracking in the headwalls appears to be unchanged.
- Cracked sidewalk in the southeast and southwest appears to be marked for replacement, as well as a curb cut in the northeast.
- Restoration is required in the southeast, southwest and northeast quadrants.
- The structure itself does not appear to have been impacted during sediment removal.





Elevation view of the structure from the upstream channel



View of the southwest wingwall





Headwall cracking appears unchanged



Headwall cracking appears unchanged





View of the southeast wingwall



View of the southeast wingwall





Curb and sidewalk replacement in the southeast quadrant



View of the structure from the southeast approach area





Cracked sidewalk marked for replacement in the southwest quadrant



Cracked sidewalk marked for replacement in the southwest quadrant





Curb replacement in the northeast quadrant



View of the northeast wingwall





View of the northwest wingwall

Designation: SA5-C-S02

Location: SA5-C-S02 is located on the west bank of Portage Creek just north of Crosstown Parkway.

Description: SA5-C-S02 a 12" clay storm sewer outlet from the Jasper Street area.

Assessment Findings:

- Failed end sections have been removed. The remaining outlet does not appear to have been impacted during sediment removal.





View of structure from the channel

Designation: SA5-C-S03

Location: SA5-C-S03 is located on the west bank of Portage Creek approximately 50' north of Crosstown Parkway.

Description: SA5-C-S03 a timber utility pole with overhead lines parallel Portage Creek.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of pole from channel

Designation: SA5-C-S04

Location: SA5-C-S04 was located on the east bank of Portage Creek approximately 75' north of Crosstown Parkway.

Description: SA5-C-S04 was a 12" clay storm sewer outlet from the Crosstown Parkway or northern Upjohn Park area.

Assessment Findings:

- The structure appears to have been removed during sediment removal. It could not be located during the evaluation. It should be confirmed that the outlet was abandoned.





Bank restoration in the area of the structure

Designation: SA5-C-S05

Location: SA5-C-S05 is located on the west bank of Portage Creek approximately 100' north of Crosstown Parkway.

Description: SA5-C-S05 a 15" clay storm sewer outlet from the Jasper Street area with concrete headwall.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of structure from the channel

Designation: SA5-C-S06

Location: SA5-C-S06 is located on the west bank of Portage Creek approximately 125' north of Crosstown Parkway.

Description: SA5-C-S06 is a cobra head style light pole for Jasper Street.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of the pole from the channel

Designation: SA5-C-S07

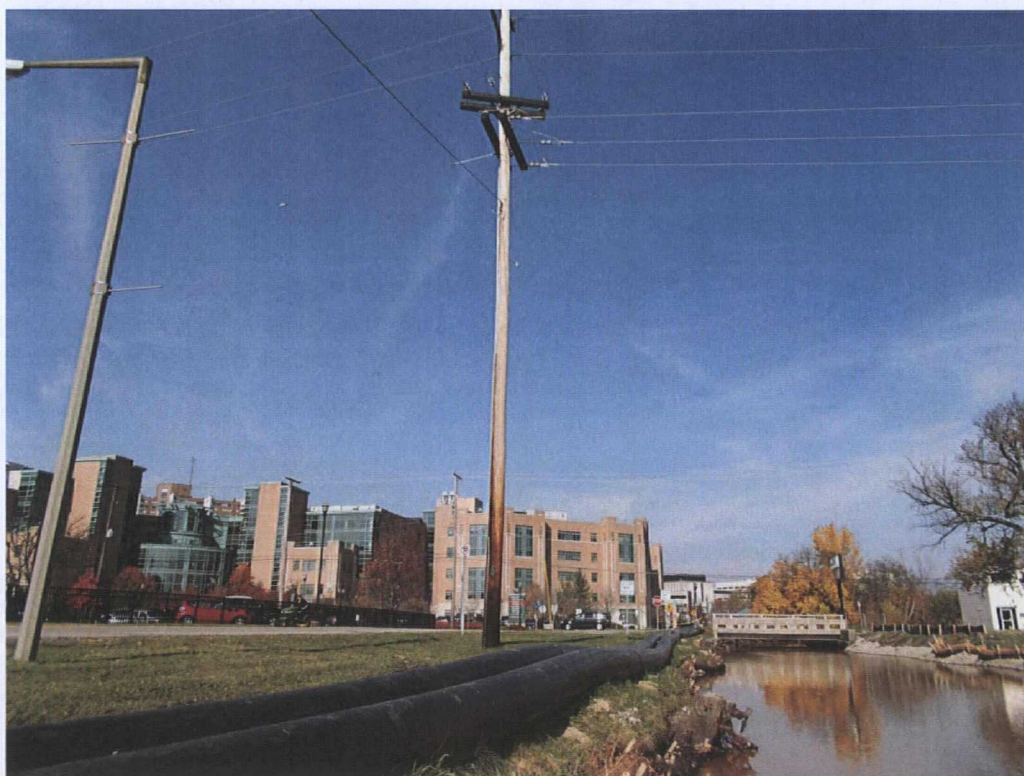
Location: SA5-C-S07 is the overhead electrical crossing of Portage Creek between Crosstown Parkway and Vine Street.

Description: SA5-C-S07 is an overhead electrical crossing with a timber pole and guy between Portage Creek and Jasper Street.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of the pole and guy from the channel

Designation: SA5-C-S08

Location: SA5-C-S08 is located on the west bank of Portage Creek at the overhead electrical crossing between Crosstown Parkway and Vine Street.

Description: SA5-C-S08 is an unidentified concrete post along the water's edge.

Assessment Findings:

- The structure was removed in conjunction with sediment removal operations.





Bank restoration in the previous area of the structure

Designation: SA5-C-S09

Location: SA5-C-S09 is located on the east bank of Portage Creek just south of Vine Street.

Description: SA5-C-S09 is a series of concrete slabs installed as bank protection.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.
- The bank has been restored around the structure.





View of the structure from the channel

Designation: SA5-C-S10

Location: SA5-C-S10 is located on the west bank of Portage Creek just south of Vine Street.

Description: SA5-C-S10 is a concrete rubble wall with storm sewer outlet penetration.

Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





View of the structure from the channel

Designation: SA5-C-S11

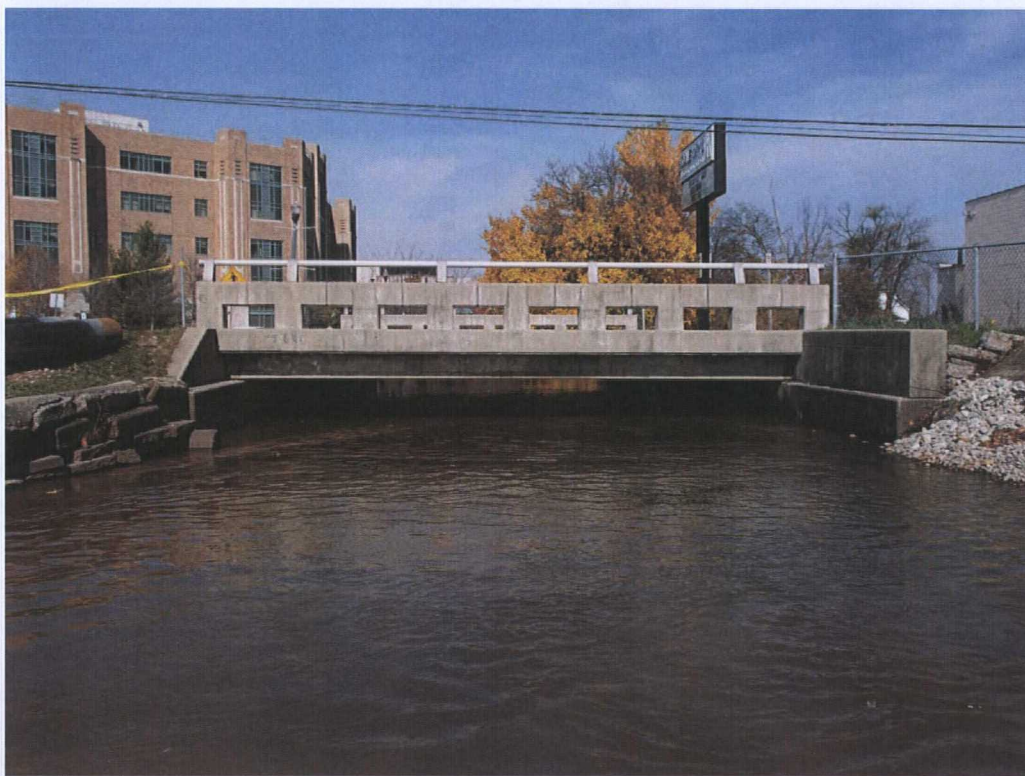
Location: SA5-C-S11 is the Vine Street bridge over Portage Creek at the north end of area SA5-C.

Description: SA5-C-S11 is a single span bridge with side by side box beams, asphalt wearing surface, concrete sidewalks and concrete parapet railings. The superstructure is carried by cast in place concrete abutments on cast in place concrete piles. The bridge was constructed in 1988.

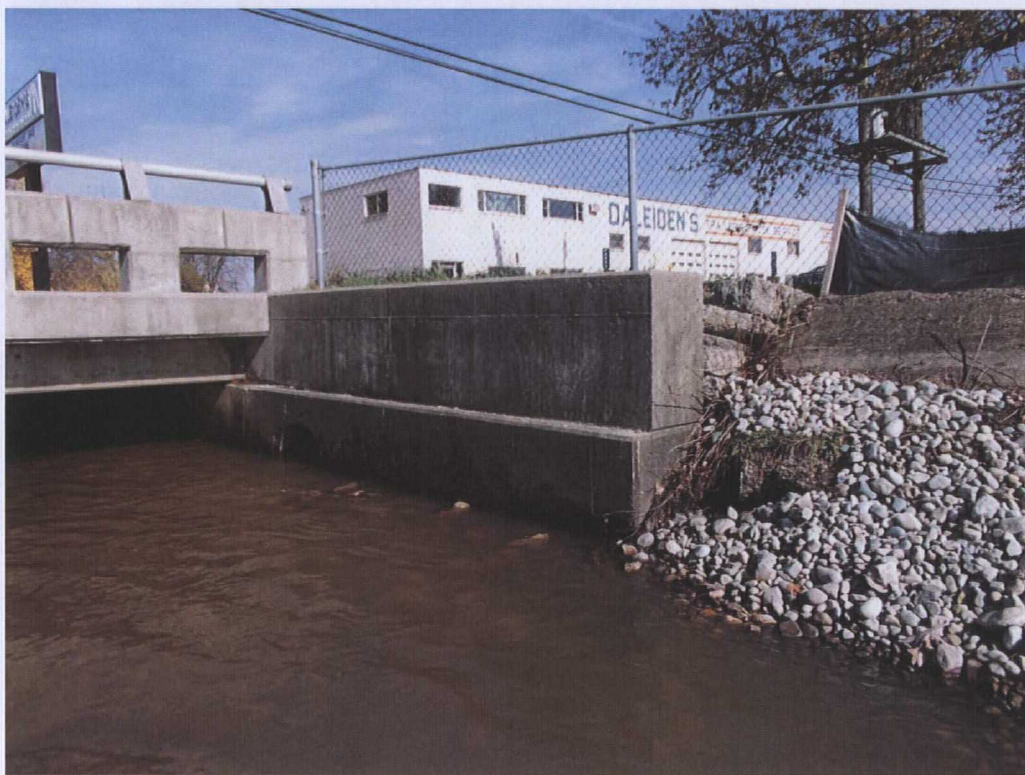
Assessment Findings:

- The structure does not appear to have been impacted during sediment removal.





Elevation view of the structure from the upstream channel



View of southeast wingwall





View of structure from the southwest approach area



Previous cracking in southwest sidewalk





North elevation view of the structure



View of the northwest wingwall





View of the northeast wingwall



